Wisconsin Predictive Analytics for Roadway Safety and Enforcement

Andi Bill
• “Predictive analytics (PA) – Technology that learns from experience (data) to predict the future behavior of individuals in order to drive better decisions.”

• Eric Siegel, founder of Predictive Analytics World and Executive Editor of Predictive Analytics Times
State Patrol Predictive Analytics Program Objectives

• Optimize staffing allocation
• Increase law enforcement visibility in the right locations at the right times to maximize impact on traffic safety
• Enhance incident management capability by reducing response time
• Create safer roads in Wisconsin
Predictive Analytics Delivery System

- Community Maps - assists with planning and resource allocation
- Mobile Architecture for Communication Handling (MACH) – provides in-car information about optimal location to deploy
• Great way for individual Agencies to do analysis
• Collecting more data
  • Citizen Contact
  • Warnings
  • Citations
Previous Mapping
Forecasting Models

• CRASH – Predict likelihood of serious injury and fatal crashes
• OWI – Predict likelihood of alcohol-involved incidents
• Incident Management – Predict likelihood of intermediate or major incidents
• CMV – Predict likelihood of commercial vehicle crashes
Predictive Model Overview

• Identifies areas of concern by time of day, day of week and geographic location
• 4-hour blocks of time
• Data is presented as a heat map and table
• Staffing is allocated accordingly
WisTransPortal

The WisTransPortal Project

Wisconsin Traffic Reporitng and Safety Laboratory

Crash Data Retrieval Facility, Version 1.1.16, July 13, 2011

The WisTransPortal Crash database contains information on all reported crashes in Wisconsin from 1994 through the current year. The Crash Data User Guide provides definitions for each column available through the online interface. Complete information on the crash portal can be found in the Crash Portal documentation page. User feedback is welcomed. Please send comments to crashportal@wisdot.wi.gov.

The number of records for this query is 2793.

Download Result Set (Text/CSV)
Wisconsin MV4000 Crash Data

Crash Reports (2008) and Statewide GIS Crash Map (2012)
Community Maps - Wisconsin County TSC Crash Mapping

This crash map is updated from preliminary police crash report data and does not represent a final and complete source of Wisconsin motor vehicle crashes. [More]

Search Results

Collection: Wisconsin DT4000 Crashes

[Image of a map with various crash data points]

There are 671 of 707 total crashes displayed. [More]

Show Search Constraints

[Options for sorting and filtering crashes]

Sort by: Crash Date, Display: Points

KV1GHOM
061 AT CIRCLE RD
LIBERTY (T), GRANT County
(A) Suspected Serious Injury
01/01/2016
Flags: CMV

9CNRTG
138 AT HILL RD
RUTLAND (T), DANE County
(A) Suspected Serious Injury
01/04/2016
Flags: CMV

GVXJi18
014 AT ROBERTY RD
CENTER (T), ROCK County
(A) Suspected Serious Injury
01/05/2016
Flags: Seat Belt, CMV, Distracted

RX2MH9W
090 WB AT SCHEPP RD
CALEDONIA (T), COLUMBIA County
(B) Suspected Minor Injury
01/05/2016
Flags: CMV, Distracted
Analyze Interface: Heat Map of CMV and Speed Related Crashes
Predictive Analysis Filters

This map is based on "K", "A", and "B" injury crashes from the last three years. Deer crashes have been excluded. [More]

There are 1316 of 1455 total crashes analyzed.

Location?
Region: SW Region
County: ALL
Municipality: ALL

Date & Time?
Summer Months (Jun-Aug)
This crash map is updated from preliminary police crash report data and does not represent a final and complete source of Wisconsin motor vehicle crashes.

Predictive Analysis Filters
This map is based on "C", "A", and "B" injury crashes from the last three years. Deer crashes have been excluded.

There are 1290 of 1483 total crashes analyzed.

Apply Reset Hide Options
- Display Crash Heat Map
- Display Crash Locations
- Display Analysis Areas
  - Analysis Area #1
  - Analysis Area #2
  - Analysis Area #3
  - Analysis Area #4
  - Analysis Area #5

Location?
- Region: SW Region
- County: All
- Municipality: All

Date & Time?
- Winter Months (Dec-Feb)
Three Pilots

- **Southwest**
  - Dedicated team (4-8 troopers) on hotspots - HVE

- **Northwest**
  - Partner with other LEO in a county

- **Northeast**
  - Leverage existing staff to provide special emphasis to hotspots

- **PA - Traffic Safety Meeting or Commission Outreach**
  - PA - Media Outreach (TV, radio, online etc.)
  - PA - Civic Group Outreach
  - PA - Community Event Outreach
  - PA - School Outreach
  - PA - Partner Law Enforcement Outreach
  - PA - Community Business Outreach
Citizen of Wisconsin:
You have had a recent contact by law enforcement officials while you were operating a vehicle in a current hotspot enforcement area identified using crash data in your county. September, October, and November of the last three years produced 311 injury crashes and 418 actual injuries in this part of our community. The following unsafe driving behaviors lead to these injury crashes:

Distracted Driving 26%
Unbelted 10%
Impaired Driving (Alcohol or Drugs) 7%

Mission: Behavior Change

The Wisconsin State Patrol is working with the local community to change the driving behavior in and around these hotspots.

Law Enforcement agencies in this area are serious about the safety of the community and we take pride in providing the highest level of service to our citizens. This operation is an extension of that philosophy and its intent is provide a safer and healthier community for all residents.

Sep, Oct, Nov 2015-2017 County and Muni Data Facts:

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<th>BIKEFLAG</th>
<th>CMVFLAG</th>
<th>CONSZONE</th>
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Predictive Analytics – SW Pilot

Sauk County

KABC Crashes, SEP – NOV, 2015 – 2017

Hot Spot #1 (Delton / Lake Delton)
  • *Distracted, Speed, Motorcycle*

Hot Spot #2 (Delton / Lake Delton)
  • *Distracted, Speed*

Hot Spot #3 (Baraboo / West Baraboo)
  • *Distracted*
Hot Spot #1 (Delton / Lake Delton)

Hot Spot #2 (Delton / Lake Delton)

Hot Spot #3 (Baraboo / West Baraboo)
Results

• Local agencies starting to take notice
• Increased visibility in these areas
• Citizen complaints / support to neutral from chiefs
• Took a few conversations to get through the change
• CM issues helped get the buy-in
• Lots of contacts
• Added Benefits
  • Bail Jumper
  • Marshall Service
• How to measure effectiveness?
  • Hours of staff
  • Contact summary
  • More warnings/citations
  • Crashes?
    • Balloon theory?
• Statistical Significance
• Validity of Model
• Building connections in the system
• Flag by causation not injury severity
• Elimination of some types
• Layer data elements
• Prototype

• Build analytics
• Reporting tools
• Evaluation tools
Any questions?